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Japanese Patent application Unexamined Publication No.2001-104840

[Scope of Claim]

[Claim 1] A fluid jet gun, comprising a nozzle formed of a flexible cylindrical body and a guide with a circular cross section disposed outside the nozzle in a radial direction, the fluid jet gun allowing a liquid to pass through on an inner peripheral side of the nozzle to be jetted from the nozzle to thereby turn the nozzle along said guide, characterized in that:

a brush is provided at a leading end portion of said guide to be disposed outside said nozzle in the radial direction in an annular form; and

the brush is disposed in a forward position in a jetting direction of the fluid jetted from said nozzle turning along said guide.

[Claim 2] A fluid jet gun, characterized by comprising:

a high-pressure jetting part for jetting a supplied fluid at high pressure;

a low-pressure jetting part for jetting a supplied fluid at low pressure and allowing the jetted fluid to be foamed; and

a selector part for selecting one of said high-pressure jetting part and said low-pressure jetting part as a part to which a fluid is supplied.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention belongs]

The present invention relates to a fluid jet gun used in jetting fluid such as, gas, liquid, or a mixture of gas and liquid.

[0002]

[Prior Art]

As a washing tool, one is used conventionally in which a wash liquid is jetted while rotating a brush by the flow of the wash liquid, thereby washing dirt away with the wash liquid while scrubbing by the rotating brush. In addition, as another washing tool, one is also used which is connected to a low-pressure washer, takes in a detergent with a pressure produced when water is supplied from the low-pressure washer, mixes the water and the detergent to allow foaming, and then jets a wash liquid.

[0003]

[Problem to be solved by the Invention]

Incidentally, in the case of the above-described one that washes dirt away with the rotating brush, there has been a problem in that the rotation of the brush in one direction does not permit the back side part of a protruding portion to be washed, whereby washing unevenness is caused. On the other hand, in the case of the gun that mixes water and a detergent to allow foaming and then jets the wash liquid, there has been a problem in that when the gun is connected to a high-pressure washer, the intake of the detergent can not be performed so that no foaming is allowed. Hence, the gun

must be connected to a low-pressure washer when allowing foaming and to the high-pressure washer when rinsing foam in order to improve the efficiency of the rinsing. Thus there has been a problem in that much time and effort are required.

[0004]

Hence, a first object of the present invention is to provide a fluid jet gun capable of carrying out washing without causing washing unevenness, and a second object of the present invention is to provide a fluid jet gun capable of carrying out easily jetting foam and rinsing.

[0005]

[Means for solving the Problem]

In order to attain the above-mentioned first object, a fluid jet gun according to claim 1 of the present device includes a nozzle formed of a flexible cylindrical body and a guide with a circular cross section disposed outside the nozzle in a radial direction, and the fluid jet gun allows a liquid to pass through on an inner peripheral side of the nozzle to be jetted from the nozzle to thereby turn the nozzle along the guide, and is characterized in that: a brush is provided at a leading end portion of the guide to be disposed outside the nozzle in the radial direction in an annular form; and the brush is disposed in a forward position in a jetting direction of the fluid jetted from the nozzle turning along the guide.

[0006]

As described above, the brush disposed outside the nozzle in the radial direction in an annular form is disposed in a forward position in the jetting direction of the fluid jetted from the nozzle turning along the guide. Hence, the brush is bent in the diameter-increasing direction upon collision of the fluid jetted from the nozzle and returns in the diameter-decreasing direction upon escape from the fluid. The position of a portion of the brush bent in the diameter-increasing direction is changed sequentially in a circle in accordance with circling fluid. As a result, the annular brush as a whole moves to repeat the increase and decrease in its diameter.

[0007]

In order to attain the above-mentioned second object, a fluid jet gun according to claim 2 of the present device is characterized by comprising: a high-pressure jetting part for jetting a supplied fluid at high pressure; a low-pressure jetting part for jetting a supplied fluid at low pressure and allowing the fluid thus jetted to be foamed; and a selector part for selecting one of the high-pressure jetting part and the low-pressure jetting part as a part to which a fluid is supplied.

[0008]

As a result of this, when it is connected to a high-pressure washer and the low-pressure jetting part is selected by the selector part as the part to which a fluid is supplied from the high-pressure

washer,, the fluid is jetted at low pressure. Thus, a detergent can be mixed with water satisfactorily by a pressure produced through water supply, and thus can be foamed excellently. On the other hand, when the high-pressure jetting part is selected by the selector part as the part to which a fluid is supplied from the high-pressure washer, the fluid is jetted at high pressure. Hence, the detergent cannot be mixed with water by the pressure produced through the water supply, and thus water alone is jetted at high pressure to permit excellent rinsing. Such selection can be made easily with the selector part of the fluid jet gun.

[0009]

[Embodiment Mode of the Invention]

A fluid jet gun according to a first embodiment of the present invention is described with reference to FIG. 1 as follows.

[0010]

A fluid jet gun 11 according to the first embodiment jets fluid such as, gas, liquid, or a mixture of gas and liquid. The fluid jet gun 11 includes a nozzle 12 formed of a flexible cylindrical body, a guide 13 with a circular cross section disposed outside the nozzle 12 in the radial direction, and an attaching part 14 for attaching the nozzle 12 to the guide 13. The fluid jet gun 11 allows fluid to pass through on the inner peripheral side of the nozzle 12 to be jetted from the nozzle 12 to thereby turn the nozzle 12 along the inner face of the guide 13.

[0011]

The attaching part 14 is configured such that a through hole, which is not shown in the figure, is formed inside thereof in the axial direction and a first external screw part 16, a hexagonal input part 17, and a second external screw part 18 are arranged in the axial direction.

[0012]

The nozzle 12 has a nozzle body 20 formed of a cylindrical body, in which the whole body is formed integrally to have a constant wall thickness with a flexible material of synthetic resin such as, for example, nylon, polytetrafluoroethylene, polyurethane, or polypropylene. The nozzle body 20 is fixed to the attaching part 14 by its one end portion such that its inner peripheral portion is communicated with the through hole.

[0013]

In addition, the nozzle 12 is provided with a coil spring 21 that allows the nozzle body 20 to fit thereinside so as to cover the nozzle body 20 from the outside, to thereby perform reinforcement against a burst or the like, etc. The coil spring 21 also is fixed to the attaching part 14 by its one end portion.

[0014]

Furthermore, the nozzle 12 is provided with: a cylindrical rotor 22 made of synthetic resin that is attached rotatably to the nozzle body 20 by allowing the leading end portion of the nozzle

body 20 projecting from the coil spring 21 to be fit inside the rotor 22; and weight parts 23 and 24 made of synthetic resin that are fixed to the nozzle body 20 while the leading end portion of the nozzle body 20 projecting from the coil spring 21 is fitted thereinside so as to be disposed on both sides of the rotor 22.

[0015]

These weight parts 23 and 24 determine the position in the axial direction of the rotor 22 with respect to the nozzle body 20 and give weight to the leading end portion so as to allow the nozzle body 20 to turn (described later) efficiently. Note that the rotor 22 serves as a part that mainly comes to contact with the guide 13 when the nozzle 12 turns along the guide 13, which is for preventing the coil spring 21 from being worn away.

[0016]

The guide 13 is made of synthetic resin and has a female screw part 26 on its inner peripheral portion on its one end side, and the first external screw part 16 of the nozzle 12 is screwed therewith. The guide 13 is in a cylindrical form (so called a "trumpet shape") whose diameter increases with distance from the female screw part 26.

[0017]

Furthermore, a brush 28 is provided at the leading end portion of the guide 13 so as to be disposed outside the nozzle 12 in the radial direction in an annular form.

[0018]

This brush 28 is formed, for example, as follows: a lot of synthetic resin hair 30 is provided in a standing condition while part of the hair is inserted inside a metal holder 29 whose cross section orthogonal to the length direction has a "U" shape, the holder 29 is riveted from its both sides to fix the hair 30, the hair 30 is made have a uniform length, and then the holder 29 is deformed into a circular shape.

[0019]

Inside the brush 28 thus formed is inserted the guide 13 from its smaller-diameter side, whereby the leading end portion of the guide 13 is fitted inside the brush 28. In this state, a covering material 32 made of rubber is put on the outer side and thus the brush 28 is fixed to the guide 13.

[0020]

In this state, the whole hair 30 of the brush 28 extends to the direction distant from the guide 13 in the axial direction of the guide 13.

[0021]

The nozzle 12 is inserted into the guide 13 with such a brush 28 attached thereto and the first external screw part 16 and the female screw part 26 are screwed together. Thus, the nozzle 12 and the guide 13 are combined to form one body. In this state, the brush 28 is disposed outside the nozzle 12 in the radial direction in

an annular form.

[0022]

To the second external screw part 18 of the nozzle 12 in this state is connected a hose or the like extending from a fluid supply source. Thus, while a fluid supplied from the fluid supply source is passed through on the inner peripheral side of the nozzle 12 to be jetted from the nozzle 12, the nozzle 12 is turned along the guide 13 so as to moves in a circular orbit while inclining outward on its leading end side. However, at this time, the position relationship between the brush 28 and the nozzle 12 is set so that the brush 28 is disposed at a forward position in the jetting direction of the fluid jetted from the nozzle 12, i.e. so that the fluid jetted from the nozzle 12 collides with the hair 30 of the brush 28 from the inner side.

[0023]

According to the fluid jet gun 11 of the first embodiment with the configuration described above, a fluid is passed through on the inner peripheral side of the nozzle 12 to be jetted from its leading end, whereby the nozzle 12 is guided by the guide 13 with a circular cross section to be turned so as to move in a circular orbit while inclining outward on its leading end side. As a result, the brush 28 is bent in the diameter-increasing direction when being hit by the fluid jetted from the nozzle 12 and returns in the diameter-decreasing direction when escaping from the fluid. Thus,

the position of the portion bent in the diameter-increasing direction is changed sequentially in a circle in accordance with the circling fluid. Consequently, the annular brush 28 as a whole moves to repeat the increase and decrease in its diameter. Hence, washing can be carried out without causing washing unevenness unlike the case of a rotational motion.

[0024]

Next, a fluid jet gun according to a second embodiment of the present invention is described with reference to FIG. 2 as follows.

[0025]

The fluid jet gun 41 according to the second embodiment is connected to a high-pressure washer (a high-pressure fluid supply source), which is not shown in the figure, when being used. The fluid jet gun 41 includes: a high-pressure jetting part 42 for jetting a fluid supplied from the high-pressure washer, at high pressure; a low-pressure jetting part 43 for jetting a fluid supplied from the high-pressure washer, at low pressure and allowing the fluid thus jetted to be foamed; a joint part 44 for connecting the high-pressure jetting part 42 and the low-pressure jetting part 43; a lever (a selector part) 45 and an internal flow channel selector part (a selector part), which is not shown in the figure, that are provided in the joint part 44 and select either one of the high-pressure jetting part 42 or the low-pressure jetting part 43 as the part to which the fluid from the high-pressure washer is

supplied.

[0026]

The high-pressure jetting part 42 includes a nozzle 47 formed of a flexible cylindrical body, a guide 48 with a circular cross section disposed outside the nozzle 47 in the radial direction, and an attaching part 49 for attaching the nozzle 47 to the guide 48. A fluid is passed through on the inner peripheral side of the nozzle 47 to be jetted from the nozzle 47, whereby the nozzle 47 is turned along the guide 48.

[0027]

The attaching part 49 is configured such that a through hole, which is not shown in the figure, is formed inside thereof in the axial direction and a first external screw part 51, a hexagonal input part 52, and a second external screw part 53 are arranged in the axial direction.

[0028]

The nozzle 47 has a nozzle body 55 formed of a cylindrical body, in which the whole body is formed integrally to have a constant wall thickness with a flexible material of synthetic resin such as, for example, nylon, polytetrafluoroethylene, polyurethane, or polypropylene. The nozzle body 55 is fixed to the attaching part 49 by its portion on one end side with its inner peripheral portion communicating with the through hole.

[0029]

In addition, the nozzle 47 is provided with a coil spring 56 that allows the nozzle body 55 to fit thereinside so as to cover the nozzle body 55 from the outside, to thereby perform reinforcement against a burst or the like, etc. The coil spring 56 also is fixed to the attaching part 49 by its one end portion. Note that the coil spring 56 covers the nozzle 47 over its entire length.

[0030]

Furthermore, the nozzle 47 is provided with: a weight part 57 made of synthetic resin that is in a cylindrical form and is fixed to the coil spring 56 with the leading end portion of the coil spring 56 fitted thereinside; and guide bodies 58 and 59 made of synthetic resin that are in a cylindrical form and are fixed to the coil spring 56 at predetermined intermediate positions with the coil spring 56 fitted thereinside.

[0031]

The above-mentioned weight part 57 gives weight to the leading end portion so as to allow the nozzle body 55 to turn (described later) efficiently. Note that the guide bodies 58 and 59 serve as portions that mainly come to contact with the guide 48 when the nozzle 47 turns along the guide 48, which is for preventing the coil spring 56 from being worn away.

[0032]

The guide 48 is made of synthetic resin and has a female screw part 61 on its inner peripheral portion on its one end side, and

the first external screw part 51 of the nozzle 47 is screwed therewith. The guide 48 includes a guide body 62 in a cylindrical form (so-called a "trumpet shape") whose diameter increases with distance from the female screw part 61 and a metal inner guide body 64 fixed to the inner side of the leading end portion of the guide body 62 with a screw 63 so as to cover the inner side.

[0033]

In the high-pressure jetting part 42 with the configuration described above, when a fluid is passed through on the inner peripheral side of the nozzle 47 to be jetted from its leading end, the nozzle 47 is guided by the guide 48 with a circular cross section and is turned to move in a circular orbit while inclining outward on its leading end side. Thus, the fluid is jetted in a cylindrical form whose diameter increases gradually.

[0034]

Here, in this high-pressure jetting part 42, the flow channel cross-sectional area of the nozzle 47 is set to be smaller than that of the low-pressure jetting part 43 (described later). As a result, the high-pressure jetting part 42 jets a fluid at higher pressure than that at which the low-pressure jetting part 43 jets a fluid.

[0035]

The low-pressure jetting part 43 includes: a nozzle 67 with a plurality of jetting holes 66 arranged in a circle with an equal

pitch; a first collision part 68 that is provided at the leading end of the nozzle 67 and has a shape whose diameter increases with distance from the nozzle 67; and a second collision part 70 with a cylindrical shape that is attached so as to cover the outer side of the nozzle 67 and has a through hole 69 formed therein.

[0036]

In this low-pressure jetting part 43, when a fluid is passed through on the inner peripheral side of the nozzle 67 to be jetted from the plurality of jetting holes 66 so that respective portions of the fluid jetted therefrom are in parallel with one another, the fluid collides with the first collision part 68 to be in a cylindrical form whose diameter increases gradually and then also collides with the inner side of the second collision part 70. At this time, the fluid takes in air introduced from the through hole 69 of the second collision part 70 and thus is foamed.

[0037]

Here, in this low-pressure jetting part 43, the flow channel cross-sectional area as the sum of the flow channel cross-sectional areas of the plurality of jetting holes 66 is set to be larger than that of the nozzle 47 of the high-pressure jetting part 42. As a result, the low-pressure jetting part 43 jets a fluid at lower pressure than that at which the high-pressure jetting part 42 jets a fluid.

[0038]

The joint part 44 connects the high-pressure jetting part 42

and the low-pressure jetting part 43 to each other in parallel and has an attachment port 72 on the opposite side to them. To this attachment port 72 is connected a high-pressure washer, which is not shown in the figure. In addition, the joint part 44 is provided with a selector lever 45 and an internal flow channel selector part, which is not shown in the figure, which allow fluid from the high-pressure washer to be supplied to either one of the high-pressure jetting part 42 or the low-pressure jetting part 43.

[0039]

According to the fluid jet gun 41 of the second embodiment with the configuration described above, when it is connected to a high-pressure washer and the low-pressure jetting part 43 is selected by the manipulation of the lever 45 as the part to which the fluid from the high-pressure washer is supplied, the fluid is jetted at low pressure. Therefore, a detergent can be mixed with water satisfactorily by a pressure produced through water supply, and thus can be foamed satisfactorily. On the other hand, when the high-pressure jetting part 42 is selected by the manipulation of the lever 45 as the part to which the fluid from the high-pressure washer is supplied, the fluid is jetted at high pressure. Hence, the detergent cannot be mixed with water by the pressure produced through water supply, whereby water alone is jetted at high pressure to permit satisfactory rinsing. Such selection can be made easily with the lever 45 of the fluid jet gun 41. Hence, the foaming jet

and rinsing can be carried out easily.

[0040]

Note that the same brush 28 as that in the first embodiment may be attached to the guide 48 of the high-pressure jetting part 42 according to the second embodiment.

[0041]

[Effect of the Invention]

As described above, according to the fluid jet gun described in claim 1 of the present invention, the brush disposed outside the nozzle in the radial direction in an annular form is disposed in a forward position in the jetting direction of the fluid jetted from the nozzle turning along the guide. Hence, the brush is bent in the diameter-increasing direction upon collision of the fluid jetted from the nozzle and returns in the diameter-decreasing direction upon escape from the fluid. The position of a portion of the brush which is bent in the diameter-increasing direction is changed sequentially in a circle in accordance with circling fluid. As a result, the annular brush as a whole moves to repeat the increase and decrease in its diameter. Hence, washing can be carried out without causing washing unevenness unlike the case of the rotational motion.

[0042]

According to the fluid jet gun described in claim 2 of the present invention, when it is connected to a high-pressure washer

and the low-pressure jetting part is selected by the selector part as the part to which a fluid from the high-pressure washer is supplied, the fluid is jetted at low pressure. Therefore, a detergent can be mixed with water satisfactorily by a pressure produced through water supply, and thus can be foamed satisfactorily. On the other hand, when the high-pressure jetting part is selected by the selector part as the part to which a fluid from the high-pressure washer is supplied, the fluid is jetted at high pressure. Hence, the detergent cannot be mixed with water by the pressure produced through the water supply, whereby water alone is jetted at high pressure to permit satisfactory rinsing. Such selection can be made easily with the selector part of the fluid jet gun. Hence, the foaming jet and rinsing can be carried out easily.

[Brief Description of the Drawings]

[FIG. 1] A sectional view showing a fluid jet gun according to a first embodiment of the present invention.

[FIG. 2] A sectional view showing a fluid jet gun according to a second embodiment of the present invention.

[Description of Reference Numerals]

11 fluid jet gun

12 nozzle

13 guide

28 brush

41 fluid jet gun

42 high-pressure jetting part

43 low-pressure jetting part

45 lever (a selector part)

を繰り返すように運動することになる。したがって、回転運動の場合のように洗いむらを生じることなく、洗浄を行うことができる。

【００４２】本発明の請求項２記載の流体噴出ガンによれば、高圧洗浄機に接続させ、該高圧洗浄機からの流体の供給先を切換部で低圧噴出部とすることで、流体が低圧で噴出されることになるため、水の供給による圧力で洗剤を水に良好に混合させることができ、良好に発泡させることができる。他方、高圧洗浄機の流体の供給先を切換部で高圧噴出部とすることで、流体が高圧で噴出されることになるため、水の供給による圧力では洗剤を水に混合させることができなくなって水のみが高圧で噴出されすすぎが良好にできることになる。このような切り換えを、流体噴出ガンの切換部で簡単に行うことができる。したがって、発泡噴出とすすぎとを容易に行うこと＊ができる。

【図面の簡単な説明】

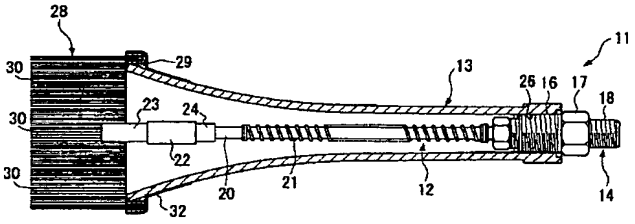
【図１】　本発明の第１の実施の形態の流体噴出ガンを示す断面図。

【図２】　本発明の第２の実施の形態の流体噴出ガンを示す断面図。

【符号の説明】

１１　流体噴出ガン
１２　ノズル
１３　ガイド
２８　ブラシ
４１　流体噴出ガン
４２　高圧噴出部
４３　低圧噴出部
４５　レバー（切換部）

【図１】



【図２】